Trying to understand run to run features

- As a cross check have many jet tree quantities booked into “per run” level histograms, and have other “summary” histograms some derived quantities like means or numbers of entries for each run. (Similar to what DQM folks have shown in the past)
  - While so many things are changing need to try to keep a handle on any changes in the data sample...
- Am currently confused about trends after run 133321.
- Lets get into it – am looking at:
  - /MinimumBias/Commissioning10-Apr20ReReco-v1/RECO runs <=133352
  - /MinimumBias/Commissioning10-PromptReco-v9/RECO runs > 133352
- Tree produced by InclusiveJetTreeProducer – usual jet pt > 3 GeV cut, NO jet trigger selection (beyond any that might be present in the definition of the MinimumBias primary DS).
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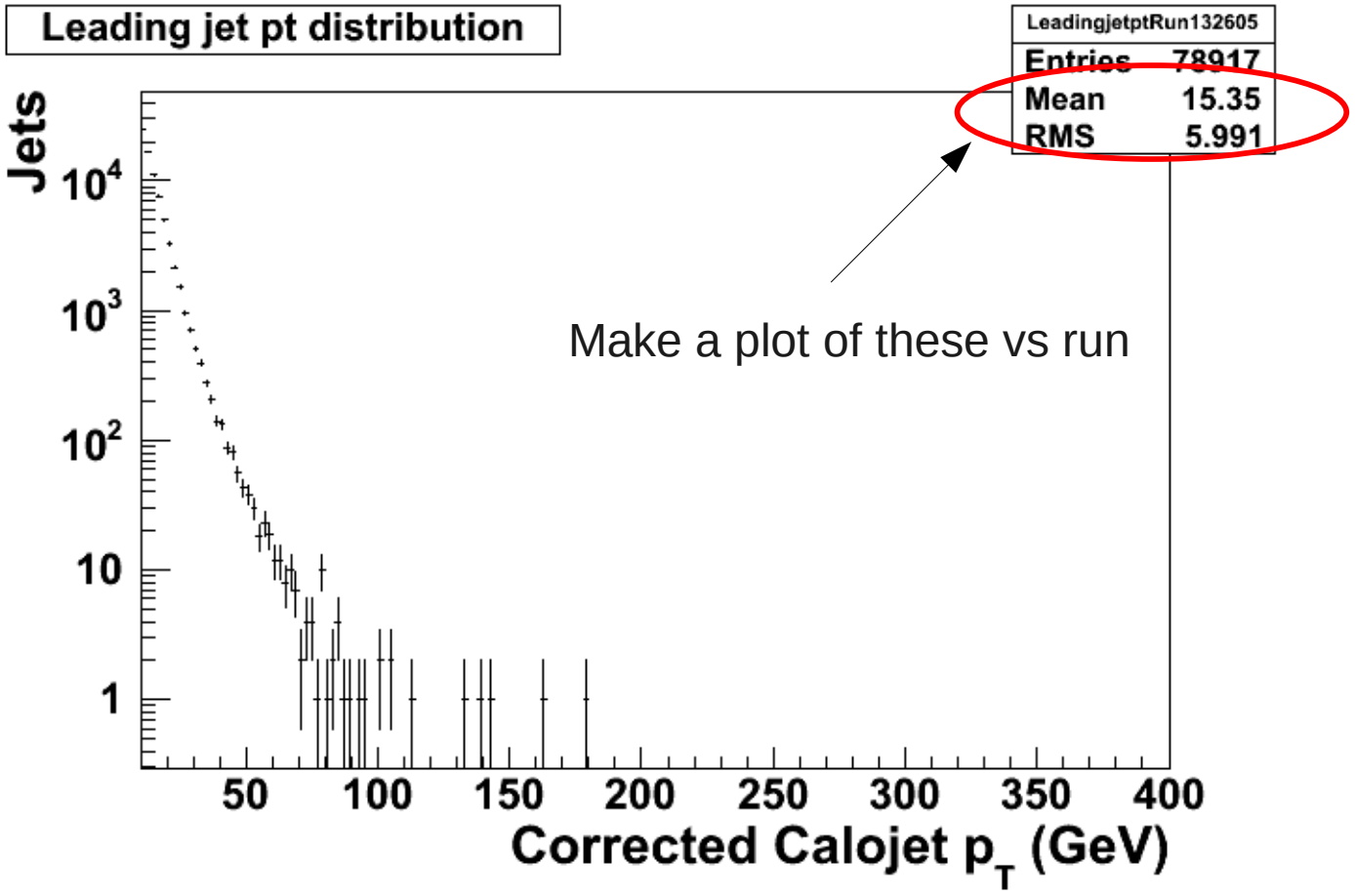
Cuts & such:

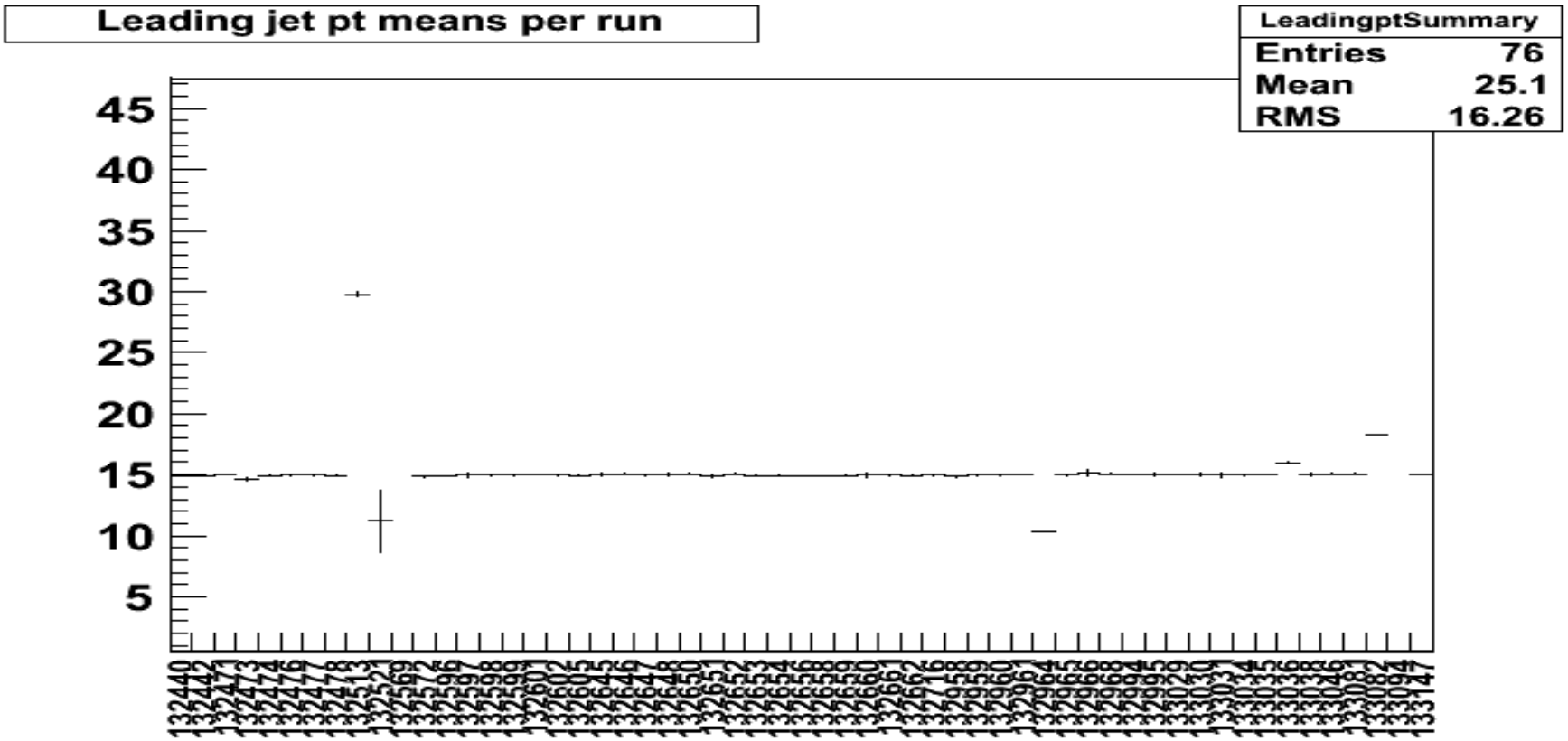
- Bit40||41 and not 36-39
- |eta| <= 2.6
- EMF>0.01
- n90hits > 1
- fHPD <= 0.98, fRBX <=0.98
- |PVz|<=15
- PVndof>=4
- Jet pt > 10 (or 50 depending on plot – see later)
- Jets corrected with L2L3Corrections_Summer09_7TeV_ReReco332_cff

An obvious thing to look at

- Mean Jet pT vs run:

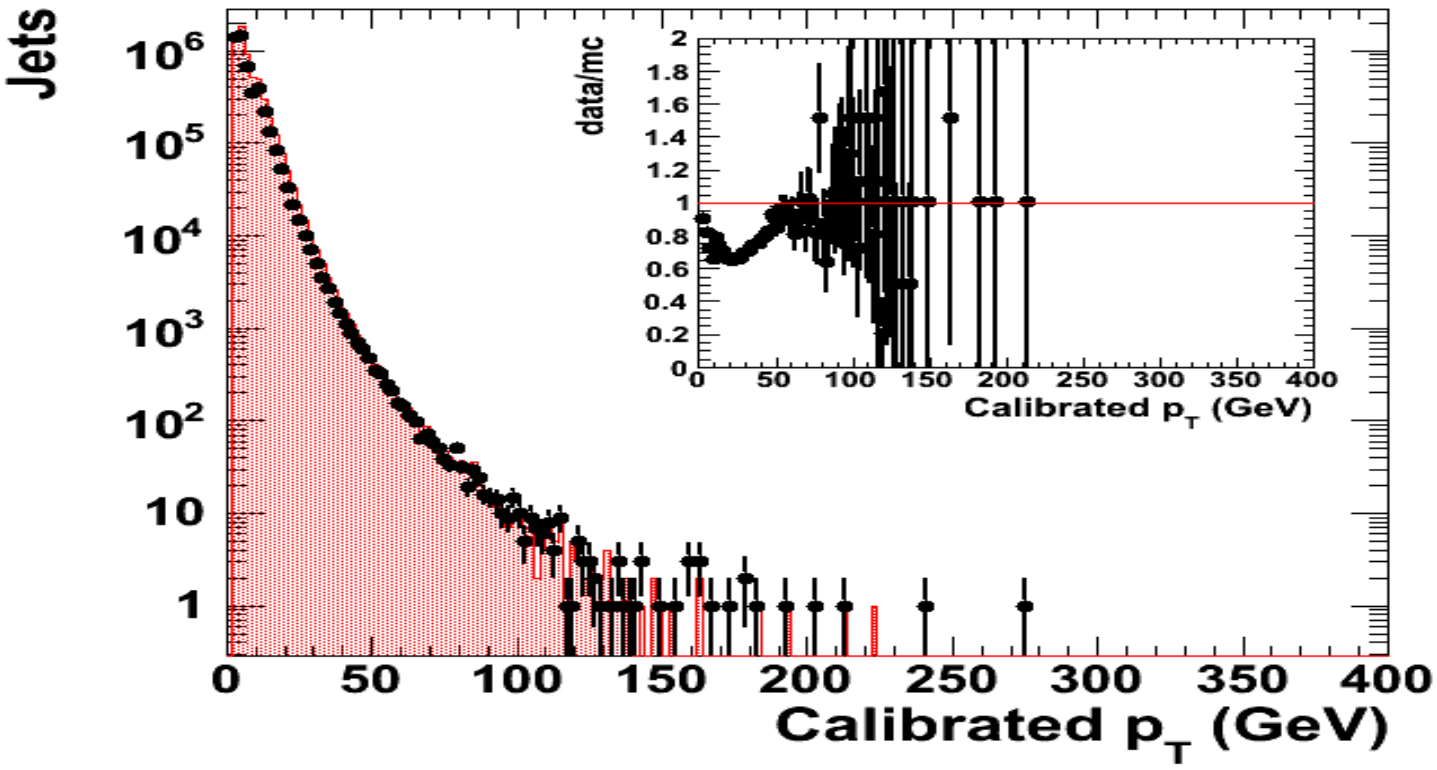


A couple weeks ago this looked like



- Except for a few known bad runs (left in this plot intentionally to make sure I could see them) this is nice & stable...

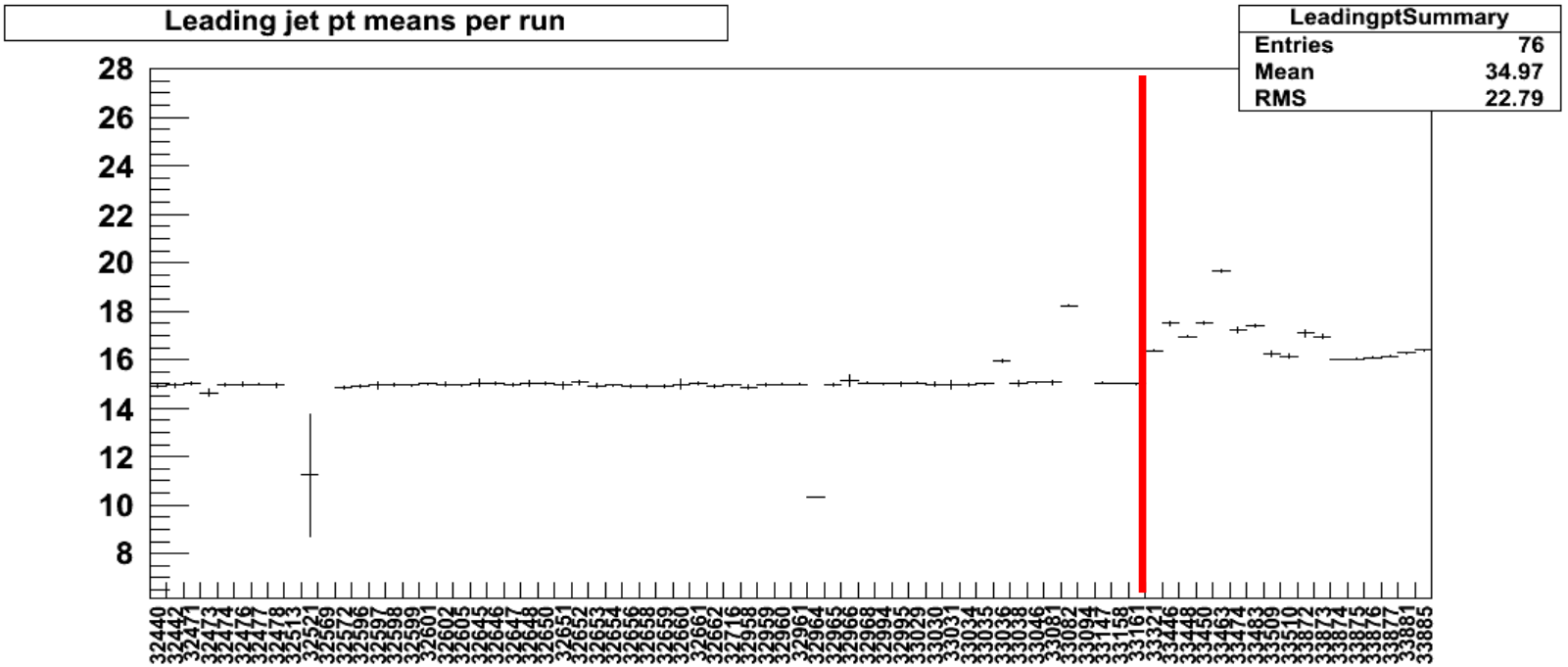
So could play games like this



- Don't take this too seriously – comparing Apr 1 rereco to 356 produced Minbias MC.
- Note though that this is normalizing by the lumi group lumi numbers (153 inv ub) at the time. -- which says up to run 133158 or so those numbers seemed to “fit” the data pretty well (should, as they're normalized to MC...)

Now lets add in new data

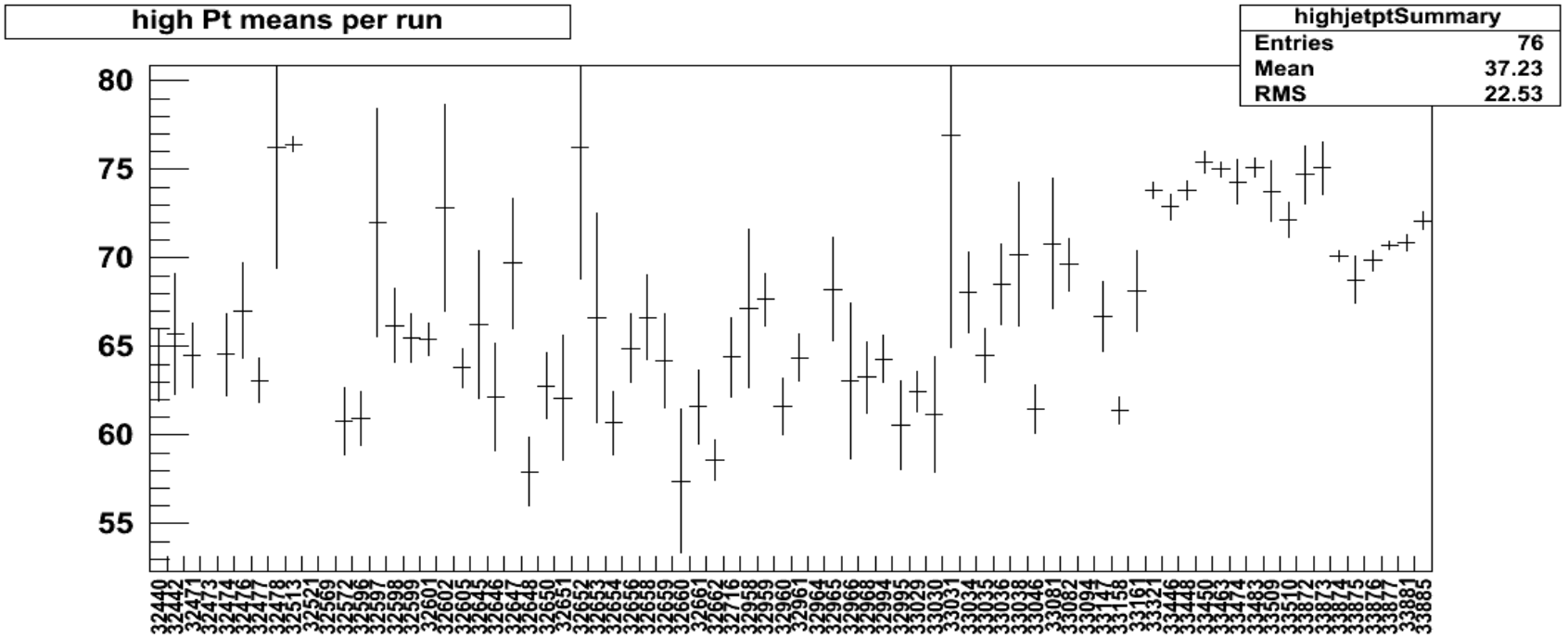
- Been scratching my head over this one for about a week now...



- Red line is start of L1 jet triggers being unmasked.
- Seems triggers are pulling something in that my cuts aren't removing...

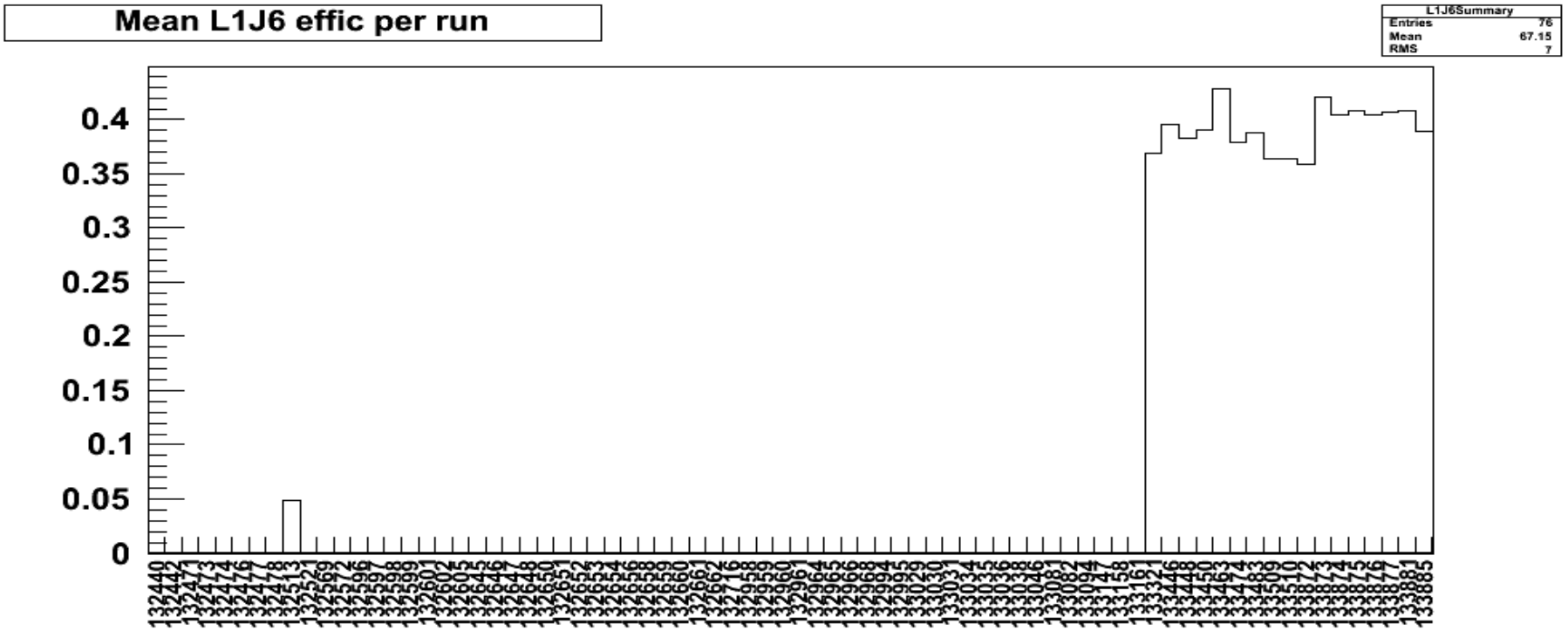
High pT?

- Same thing, require jets > 50 GeV:



Still see the jump & maybe some structure for the squeeze runs at the end...

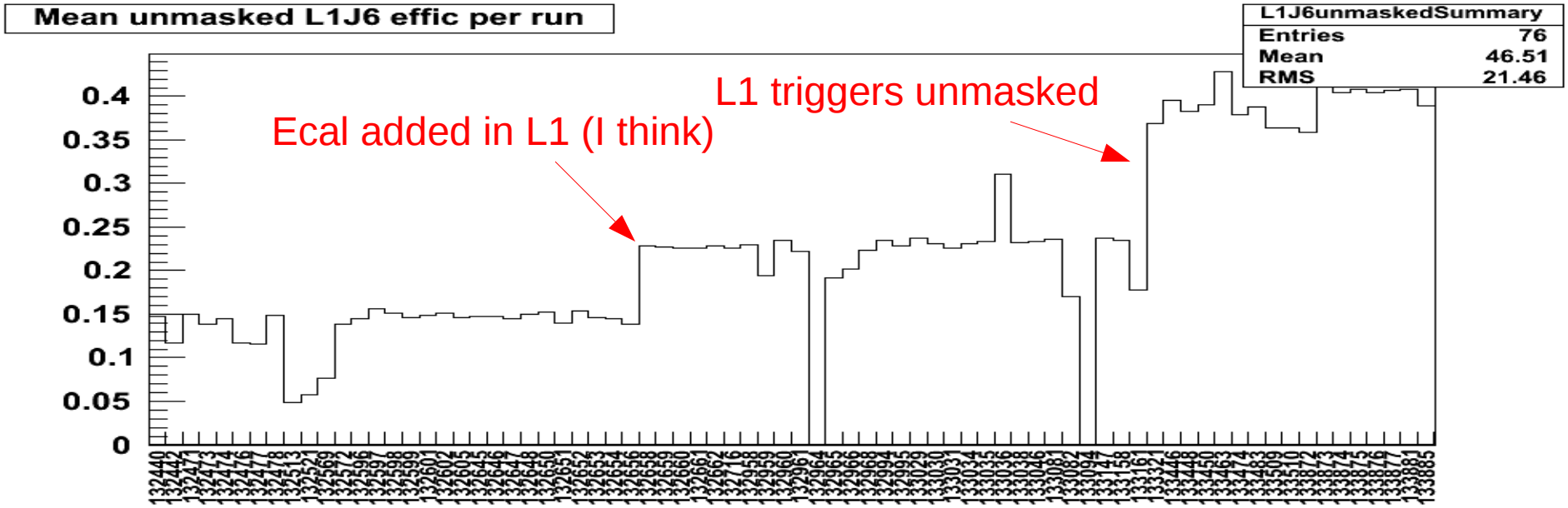
How I know thats when they unmasked L1



- Ratio of selected jets that for which L1J6 (masked) trigger fired.
- Starts at same run as red line on prev. slide.

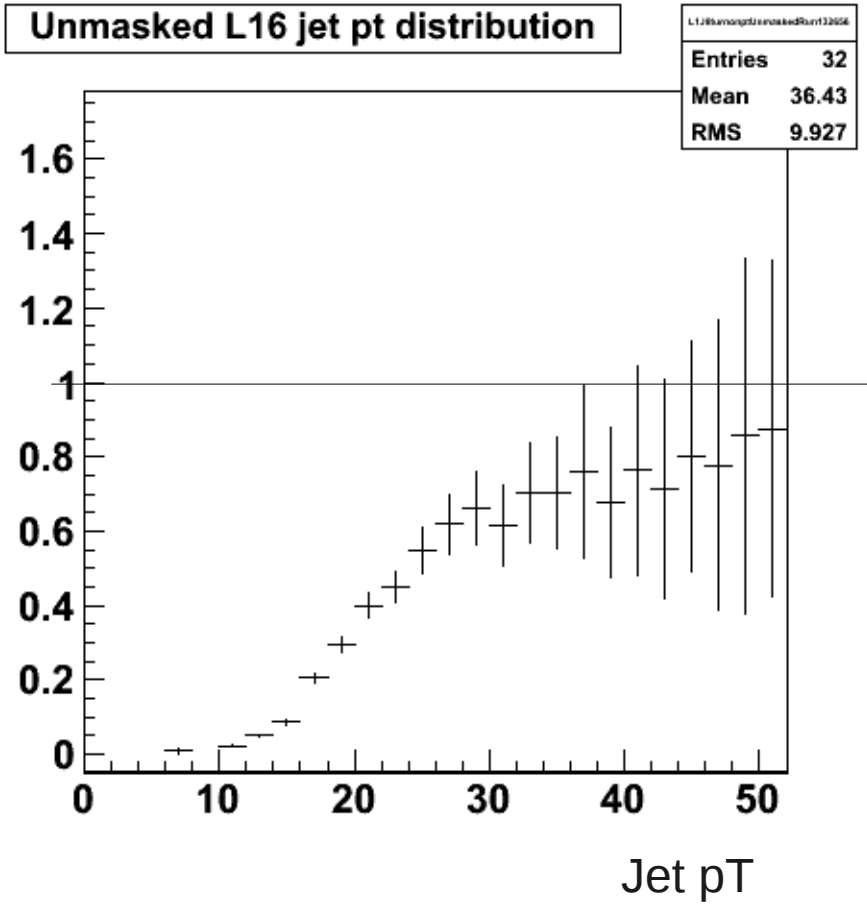
Actually to wander on a tangent...

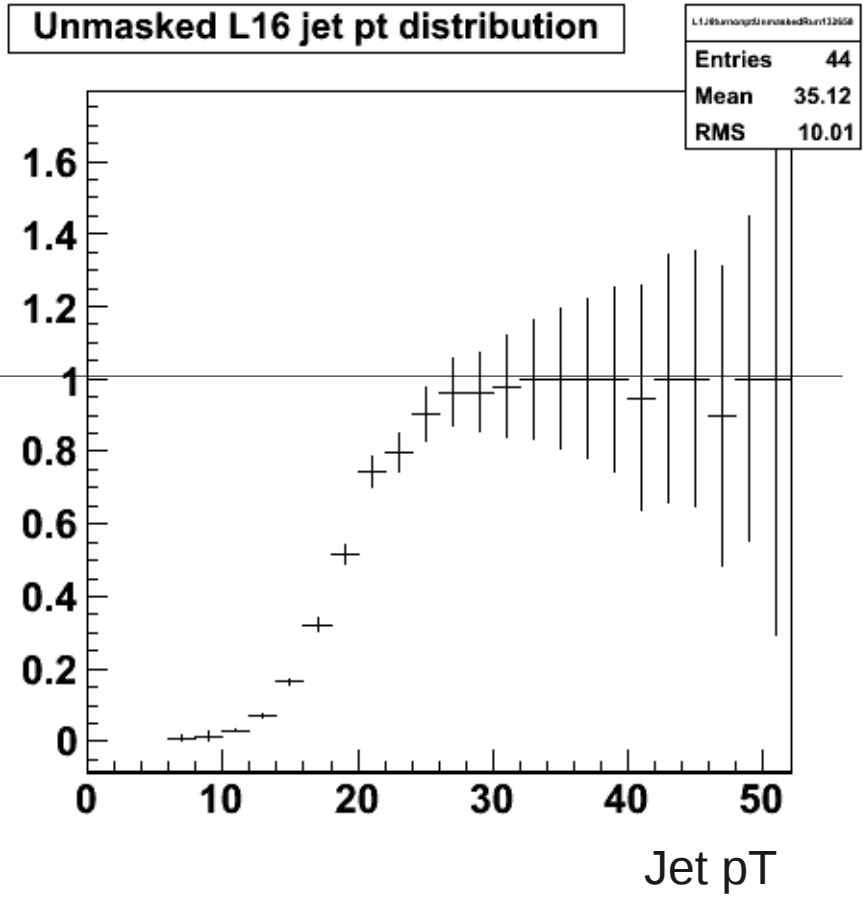
- Same plot for unmasked triggers:



- See jump in jets which fire L1 when ecal added (as one would hope)
- Then on top of that increase in jets in sample which fire L1 once they're unmasked (believe this means participates in the trigger decision)
- Possibly also see a jump at the squeeze (run 133873)?

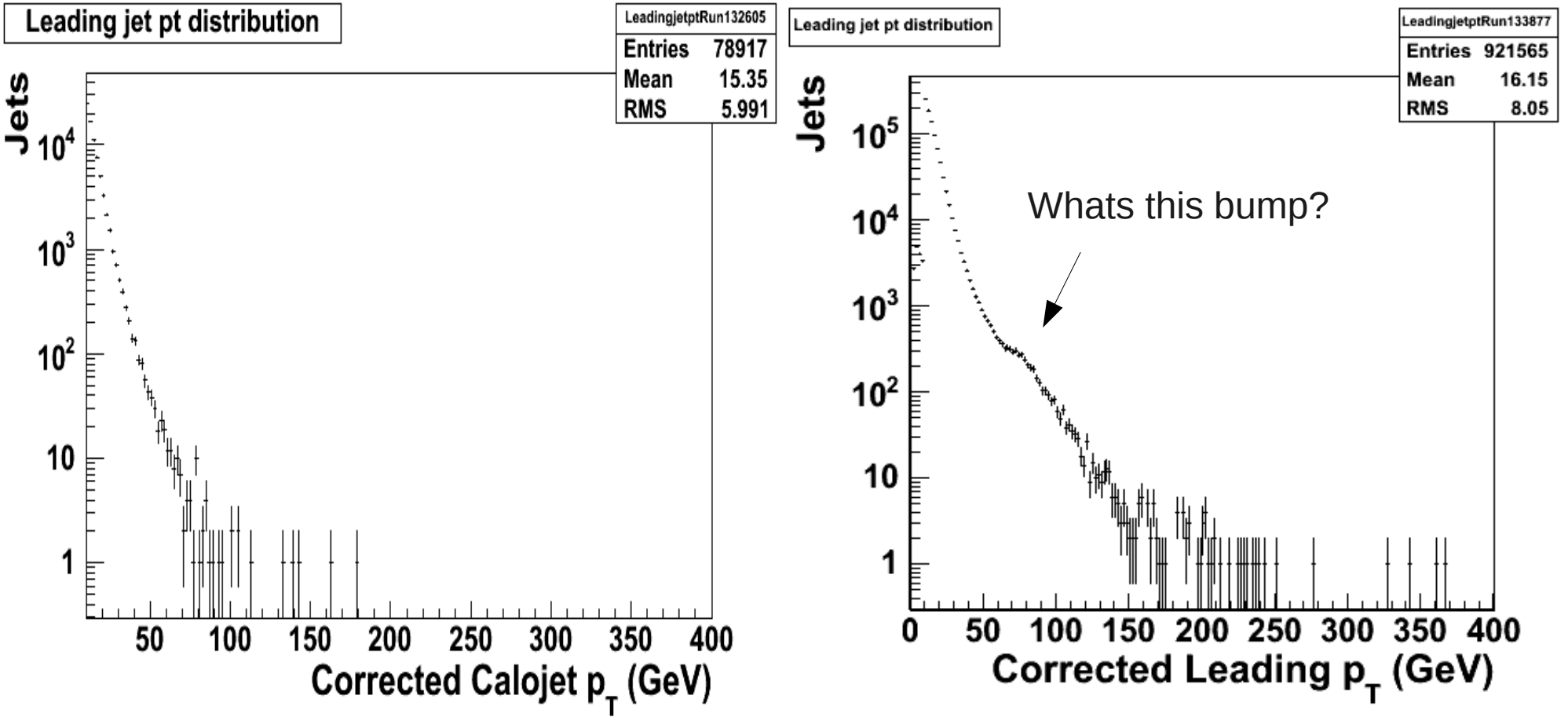
Ecal jump I think makes sense





- Yes, errors bars. We know.
- Plots are ratio of jets before Ecal included (run 132656) and after (132658) – efficiency goes up, we catch more with the trigger.
- This plot looks identical on both sides of the “trigger unmasked” transition though...

Back to the unmasking jump. Run 132605 vs Run 133877

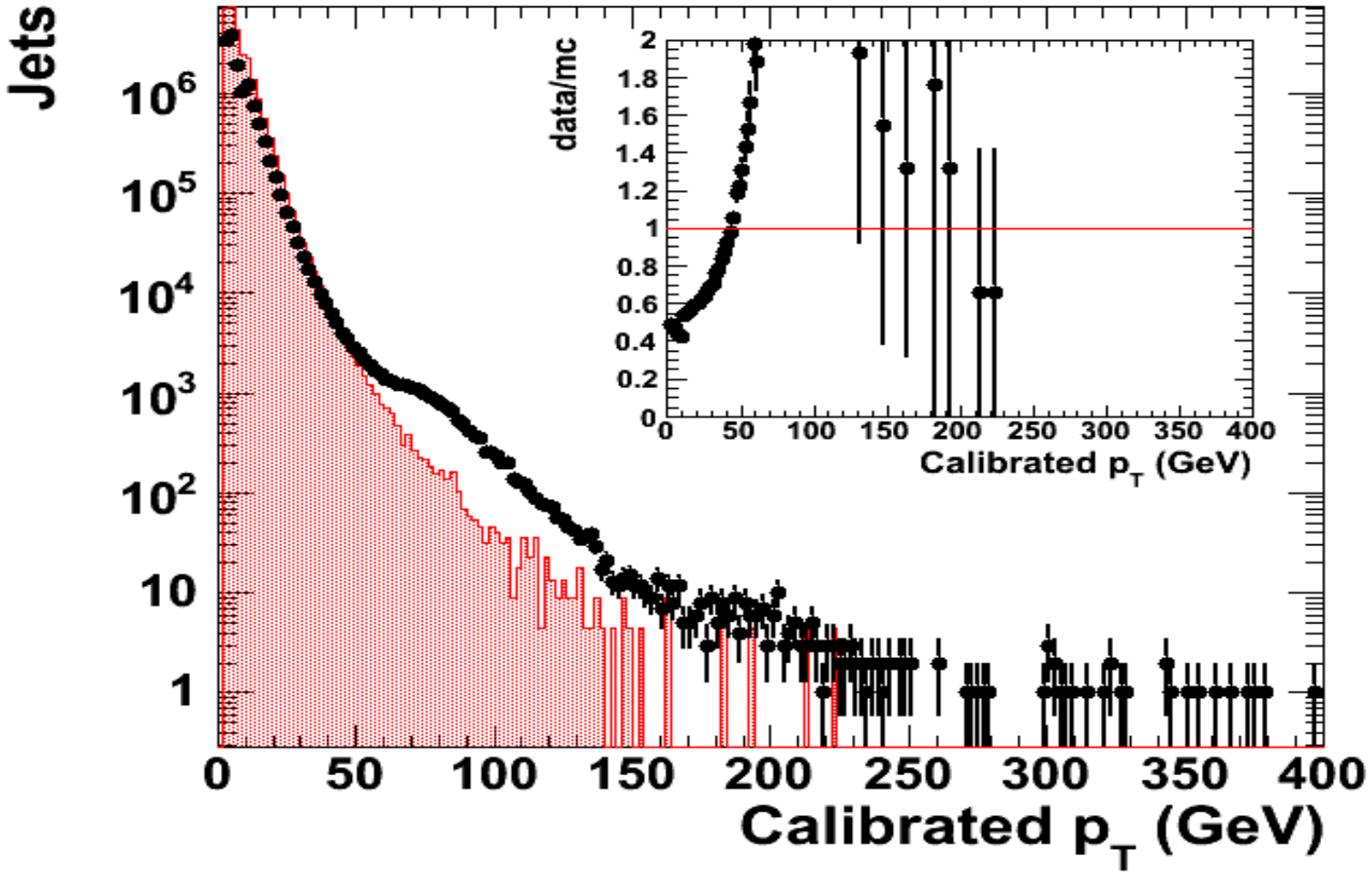


- "New events" pulled in by the trigger now that its active?
- Noise not removed by cuts? (Even with good vertex & Jet ID?)

Lets try another game

- Look at LUMI NORMALIZED Data vs MC for both pre L1 unmasking and post L1 unmasking.
- Pre L1 unmasking runs for me means:
  - Runs 132440, 132599, 132601, 132605, 132648, 132650, 132651, 132654, 132716, 132959, 132960, 132961, 132965, 132968, 133034, 133038, 133046, 133158
  - Int Lumi 153 inv ub (from lumi twiki)
- Post L1 unmasking runs for me means:
  - Runs 133321, 133450, 133474, 133483, 133509, 133510, 133874, 133875, 133876, 133877, 133881, 133885
  - Int Lumi 700 inv ub (also from lumi twiki as of 4/27)
- We already know the answer for pre unmasking – thats on slide 5. What does the new stuff look like (again comparing to 356 minbias MC):

Yuck!


Jets
10^6
10^5
10^4
10^3
10^2
10
1
0
50
100
150
200
250
300
350
400
Calibrated p_T (GeV)
data/mc
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
50
100
150
200
250
300
350
400
Calibrated p_T (GeV)

OK...

- At this point I have a passed out 4 year old on the floor that I should now deposit in his bed :)
- Clearly the L1 trigger in MinimumBias now is adding some noise or something to data for me thats not in the MC.
- I am assuming this is due to a cut I'm missing somewhere – but I seem to be blind to it.
- One thing of interest is note “point 8” in the lumi twiki notes – they seem to have moved away from MinimumBias in favor of ZeroBias for their calculations to avoid prescale complications. I'll look at that tomorrow and see if this does anything different for me.
- Would be very interested if you guys see anything like this however! -- to be continued tomorrow...